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10/532,560	04/25/2005	Philippe Lescoche	71247-0038	4389

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CLARK & BRODY
1700 Diagonal Road, Suite 510
Alexandria, VA 22314

EXAMINER	
MELLON, DAVID C	
ART UNIT	PAPER NUMBER
1797	
MAIL DATE	DELIVERY MODE
09/14/2010	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/532,560	LESCOCHE, PHILIPPE	
	Examiner	Art Unit	
	DAVID C. MELLON	1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 July 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4 and 6-17* is/are pending in the application.

4a) Of the above claim(s) *10-17* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4 and 6-9* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

2. Claims 1-4 and 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Garcera et al. (USP 6,375,014), in view of Childs et al. (USP 7,247,370), initial publication 1/30/2003 as WO 03/008078 with effective filing date 7/20/2001 from US Provisional 60/306412.

Regarding claim 1, Garcera et al. discloses a membrane with an increasing mean porosity in the direction of flow (Abstract) in figure 1 comprising:

- A porous support (1), delimiting at least one flow channel for fluid to be treated (2) flowing in a given direction between an inlet and an outlet (see in figure 1 arrows indicating direction of flow)
- Having variable partial-pore filling (C5/L50-65 – impregnation) on a portion of the support of a constant thickness creating a mean porosity gradient in the direction of the flow of fluid (Abstract, see section 3 in figure 1, "region impregnated", C4/L35-41), the minimum porosity being located at the inlet and the maximum porosity at the outlet (C4/L23-35 – see also figure 1, decreasing amount of impregnation from inlet to outlet)
- Partial pore filling using inorganic particles (C6/L15-30 - ceramic particles)
- A separating layer (C2/L55-60, C1/L1-25, C4/L1-10) coated on the inner surface of the porous support (see C1/L4-15)

Garcera et al. does not explicitly disclose that the partial-pore filling is such that the partial-pore filling extends from the inner surface of the porous support (the surface upon which the separating layer is laid).

Childs et al. discloses asymmetric membranes composed of a microporous substrate whose pores contain a cross-linked gel being greater at or adjacent to a surface of the membrane (Abstract) in figure 5, specifically the instance pictured on the left in figure 5. Childs et al. discloses that the pore filling gel can be placed in a configuration such that the porous support filled with the gel asymmetrically is facing the fluid flowing rather than being on the outside away from the flow of fluid (see figure 5 on the left and C8/L10-40).

Garcera et al. and Childs et al. are combinable because they are concerned with the same field of endeavor, namely that of pore filling of porous membrane supports.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the partial-pore filled membrane structure of Garcera et al. by making it such that the partial-pore filling occurs from the inside of the membrane to the outside as taught by Childs et al. for the purpose of decreasing the amount of fouling experienced by the membrane during operation as well as to provide additional separation capability by having reduced pore size immediately after the separation layer and to provide the benefit of reduced pressure drop across the membrane.

Regarding claim 2, modified Garcera et al. discloses all of the claim limitations as set forth above. Furthermore, modified Garcera et al. inherently discloses a flux density

gradient per unit of pressure with the minimum flux at the inlet and the maximum at the outlet since the porosity is lowest at the inlet and highest at the outlet.

Regarding claim 3, modified Garcera et al. discloses all of the claim limitations as set forth above. Garcera et al. as modified by Childs et al. further discloses that the mean porosity of the support increases inside the support in a transverse direction to the direction of the flow of fluid between the inside surface and the outer surface (see figure 1 of Garcera et al. and further figure 5 of Childs et al.).

Regarding claim 4, modified Garcera et al. discloses all of the claim limitations as set forth above. Modified Garcera et al. further discloses that the variable partial-pore filling is made over a depth from the inner surface which decreases in the direction of flow (see figure 1 in Garcera et al. along with figure 5 of Childs et al., combined as such to create the partial-pore filling from the inside to the outside and a decreasing penetration depth in the direction of the fluid flow).

Regarding claim 6, modified Garcera et al. discloses all of the claim limitations as set forth above. Garcera et al further discloses that the partial pore-filling is obtained by penetration of the support with inorganic particles whose mean diameter is smaller than the mean pore diameter of the support (C6/L15-20 - 0.1-4 micron particles, C8/L10-21 - 12 micrometer initial pore diameter, C6/L5-10 - "inorganic" impregnation material).

Regarding claim 7, modified Garcera et al. discloses all of the claim limitations as set forth above. Garcera et al. further discloses that the penetration of inorganic particles is followed by sintering (C5/L64-C6/L5).

Regarding claim 8, modified Garcera et al. discloses all of the claim limitations as set forth above. Garcera et al. as modified by Childs et al. further discloses a mean porosity which increases in a substantially continuous manner in the direction of the flow of fluid to be treated to obtain a substantially constant permeate flow along the flow channel (see figure 1 of Garcera et al., C5/L30--52).

3. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Garcera et al. (USP 6,375,014), in view of Childs et al. (USP 7,247,370), initial publication 1/30/2003 as WO 03/008078 with effective filing date 7/20/2001 from US Provisional 60/306412, and further in view of Grangeon et al. (USP 6,499,606) with French foreign priority date of 8/4/1999.

Regarding claim 9, modified Garcera et al. discloses all of the claim limitations as set forth above. Garcera et al. does not explicitly disclose the use of mean porosity plateaus in the direction of flow, with the length of the plateaus being substantially identical.

Grangeon et al. discloses a cross-flow filter membrane (title) comprising a porous support and a separator layer (abstract) in figures 1-3. The membrane has an inorganic porous support (2) with a separator layer (4). Grangeon et al. in figure 3 discloses a thickness gradient in the separator layer that diminishes in steps P in the flow direction of the fluid to be treated (C4/L35-45) which are of substantially the same length.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the mean porosity gradient of Garcera et al. such that it is stepwise using plateaus as taught by the separator layer of Grangeon et al. for the purpose of

having areas of known mean porosity at constant levels rather than potentially variable continuous zones.

Response to Arguments

4. Applicant's arguments filed 7/2/2010 have been fully considered but they are not persuasive.

- Applicant alleges that one of skill in the art would replace the pore filling of Garcera with that of Childs and not change the position of the layer in Garcera.

This argument is not persuasive. One having ordinary skill in the art would recognize the benefit of having a semi-steady porosity or size exclusive gradient throughout the membrane to provide numerous benefits. First, by having the pore filling facing the separation layer and not opposite to it, the benefit of reduced pressure drop across the membrane would be recognized. Second, by moving the pore filling to the facing side, there would be the elimination of the potential of having a fluid stagnation zone. Additionally, in the event the separation layer were to fail, one of skill in the art would recognize that by having the pore filling immediately following the separation layer, the benefit of reduced fouling would be immediately recognized. While the pore filling of Garcera is not explicitly recognized as providing a separating effect, it would inherently provide a size exclusion based separation. Furthermore, the Childs reference was looked to for various configurations of pore filling that are available in the prior art.

In response to applicant's argument that the gel of Childs must be used to replace the inorganics of Garcera, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In this case, one of ordinary skill in the art would have recognized the option of having alternative configurations for pore filling with respect to which surface is in contact with the fluid to be treated.

- Applicant alleges that the pore filled portion of Garcera is not a separation layer.

This argument is fatally flawed. Pore filling provides reduced pore size. Inherently, a reduced pore size provides a separation effect by size exclusion type separation. In other words, particles in a fluid that are larger than the reduced pore size would not pass through the pore filling simply because they do not fit. The argument that Garcera did not recognize this benefit is irrelevant. The argument that Garcera provided this for another purpose is not persuasive. One having ordinary skill in the art would recognize both explicit and implicit benefits and features in the prior art. Just because the impregnation layer provides a pressure brake effect does not mean that it also cannot provide a filtration effect. Further, one of skill in the art would routinely recognize that filter units and membranes may have multiple layers or methods for

filtering. Just because Garcera teaches an independent separation layer does not mean that another part of the Garcera membrane is incapable of providing filtration.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DAVID C. MELLON whose telephone number is (571)270-7074. The examiner can normally be reached on Monday through Thursday 9:00am-5:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571) 272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Tony G Soohoo/
Primary Examiner, Art Unit 1797

/D. C. M./
Examiner, Art Unit 1797